

ABSTRACT

In a data-replication system, multi-way synchronization of copies of the data at different devices is achieved by employing a non-destructive data model. In this model, each replicated data object is represented by a revision graph, and every operation that is performed on a data object, e.g. a revision of data content or deletion of the object, is represented by adding a node to a revision graph at the device where the change is made. Synchronization between multiple devices is achieved by applying a graph union operator. Since the union operator is commutative and associative, it avoids the limitations normally associated with the order in which updates occur. A synchronization enforcement mechanism restricts the situations in which the nodes of a graph can be deleted, to thereby ensure integrity of the data throughout its useful life cycle.

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